

microspheres of said first subpopulation of microspheres are a different size than the microspheres of said second subpopulation.

33. (Amended) A composition according to claim 24, 66, 28, or 32 wherein said first and said second subpopulations comprise a first and a second bioactive agent, respectively.

34. (Amended) The composition according to claim 33, wherein said first and second subpopulations further comprise a first and a second optical signature, respectively.

35. (Amended) A composition according to claim 34 wherein said at least one of said optical signatures comprises at least one chromophore.

36. (Amended) A composition according to claim 34 wherein said at least one of said optical signatures comprises at least one fluorescent dye.

37. (Amended) A composition according to claim 36 wherein said fluorescent dye is entrapped within said microspheres.

38. (Amended) A composition according to claim 36 wherein said fluorescent dye is attached to said microspheres.

39. (Amended) A composition according to claim 34 wherein said optical signature comprises at least two fluorescent dyes.

40. (Amended) A composition according to claim 66 wherein said bioactive agent comprises a protein.

41. (Amended) A composition according to claim 40 wherein said protein is selected from the group consisting of enzymes and antibodies.

42. (Amended) A composition according to claim 66 wherein said bioactive agent is a **nucleic acid**.

46. (Amended) A method according to claim 45 wherein said substrate is a optical fiber bundle and said microspheres are located within wells at a first terminal end of said bundle.

47. (Amended) A method according to claim 45 further comprising identifying the location of said first and second bioactive agent on said substrate.

48. (Amended) The method according to claim 45, wherein said discrete sites are wells.

49. (Amended) The method according to claim 45, wherein said substrate is selected from the group consisting of glass and plastic.

51. (Amended) A method according to claim 50, wherein said distributing comprises serially adding said subpopulations to said sites.

52. (Amended) A method according to claim 50, wherein said substrate is a fiber optic bundle.

53. (Amended) A method according to claim 50, wherein said substrate is selected from the group consisting of glass and plastic.

54. (Amended) A method according to claim 50, wherein said sites are wells.

55. (Amended) A method according to claim 45 or 50, wherein said bead is covalently attached to the well.

56. (Amended) A method according to claim 45 or 50, wherein said bead is non-covalently attached to the well.

57. (Amended) A method according to claim 45 or 50, wherein said bioactive agent is a nucleic acid.

The following claims are new:

58. (New) A composition according to claim 27 wherein said substrate is glass.

59. (New) A composition according to claim 27 wherein said substrate is plastic.

60. (New) A composition according to claim 30 wherein said protein is an enzyme.

61. (New) A composition according to claim 30 wherein said protein is an antibody.

62. (New) A composition according to claim 41 wherein said protein is an enzyme.

63. (New) A composition according to claim 41 wherein said protein is an antibody.

64. (New) A method according to claim 49 or 53 wherein said substrate is glass.

65. (New) A method according to claim 49 or 53 wherein said substrate is plastic.

66. (New) A method according to claim 25, wherein said population of microspheres comprises at least a first and a second subpopulation.

67. (New) A method according to claim 45 or 50 when said bioactive agent is a protein.